CLAIMS

What is claimed is:

1. A Radio Resource Management (RRM) component for a wireless telecommunication system that provides wireless communication service in predetermined geographic areas to Wireless Transmit Receive Units (WTRUs) within such areas, the RMM component comprising:

a plurality of finite state machines (FSMs) for controlling radio resources for a specified geographic area serviced by the telecommunication system;

each FSM configured with a plurality of states where in a selected set of functions are implemented based on state based parameters; and

each FSM configured with a plurality of state switches for toggling the FSM from one state to a different state in response to changes in the wireless communication load between the telecommunication system and WTRUs within the specified geographic area

2. The invention of claim 1 wherein the wireless telecommunication system is a 3GPP system which services geographic areas designated as cells and the RMM component is configured to implement selected functions within a Radio Network Controller (RNC) with respect to a designated cell for which the RNC manages radio resources.

3. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing Real Time (RT) communication functions and a FSM for implementing Non Real Time (NRT) communication functions.

4. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing UpLink (UL) communication functions and a FSM for implementing Down Link (DL) communication functions.

5. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions.

6. The invention of claim 5 wherein the RMM component is configured to implement selected C-RNC functions for Time Division Duplex (TDD) communications having a predetermined Time Slot format and wherein the FSM state switches are configured to toggle the respective FSM from one state to a different state in response to changes in the wireless communication load within Time Slots.

7. The invention of claim 6 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states.

8. The invention of claim 7 in which a first time slot load threshold TST1 is selected wherein:

each state switch operable to toggle a FSM from the normal state to the high state is configured to operate when the load in at least one time slot exceeds the first threshold TST1, and

each state switch operable to toggle a FSM from the normal state or the high state to the overload state is configured to operate when the load in at least a predetermined percentage X of timeslots allocated in the cell exceed the first threshold TST1.

9. The invention of claim 8 wherein each state switch operable to toggle a FSM to return to one state from a different state is configured to operate based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch is configured to operate the FSM to switch from the one state to the different state.

10. The invention of claim 9 in which a second time slot load threshold TST2 is selected based on the first threshold TST1 minus a hysterisis factor wherein:

each state switch operable to toggle a FSM to return to the normal state from the high state or the overload state is configured to operate when the load in all time slots falls below the second threshold TST2, and

each state switch operable to toggle a FSM to return to the high state from the overload state is configured to operate when the load in at least 100-X percentage of timeslots allocated in the cell fall below the second threshold TST2.

11. The invention of claim 1 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states.

12. The invention of claim 11 wherein each state switch operable to toggle a FSM to return to one state from a different state is configured to operate based on a threshold that includes a hysterisis factor that is complementary to a threshold

upon which the respective state switch is configured to operate the FSM to switch from the one state to the different state.

13. A method of Radio Resource Management (RRM) for a wireless telecommunication system that provides wireless communication service in predetermined geographic areas to Wireless Transmit Receive Units (WTRUs) within such areas comprising:

providing a plurality of finite state machines (FSMs), each FSM configured with a plurality of states where in a selected set of functions are implemented based on state based parameters; and

controlling radio resources for a specified geographic area serviced by the telecommunication system by toggling the FSMs from one state to a different state in response to changes in the wireless communication load between the telecommunication system and WTRUs within the specified geographic area

14. The method of claim 13 wherein the wireless telecommunication system is a 3GPP system which services geographic areas designated as cells and the provided FSMs are configured to implement selected functions within a Radio Network Controller (RNC) with respect to a designated cell for which the RNC manages radio resources.

15. The method of claim 14 wherein the providing FSMs includes providing a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC.

16. The method of claim 15 wherein the FSMs are configured to implement selected C-RNC functions for Time Division Duplex (TDD) communications having a predetermined Time Slot format and wherein the toggling the respective FSMs from one state to a different state is in response to changes in the wireless communication load within Time Slots.

17. The method of claim 16 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states and each state switch operable to toggle a FSM to return to one state from a different state operates based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch operates the FSM to switch from the one state to the different state.

18. The method of claim 17 further comprising selecting a first time slot load threshold TST1 and a second time slot load threshold TST2 based on the first threshold TST1 minus a hysterisis factor such that:

each state switch operable to toggle a FSM from the normal state to the high state operates when the load in at least one time slot exceeds the first threshold TST1,

each state switch operable to toggle a FSM from the normal state or the high state to the overload state operates when the load in at least a predetermined percentage X of timeslots allocated in the cell exceed the first threshold TST1,

each state switch operable to toggle a FSM to return to the normal state from the high state or the overload state operates when the load in all time slots falls below the second threshold TST2, and

each state switch operable to toggle a FSM to return to the high state from the overload state operates when the load in at least 100-X percentage of timeslots allocated in the cell fall below the second threshold TST2.

19. The method of claim 13 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states and each state switch operable to toggle a FSM to return to one state from a different state operates based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch operates the FSM to switch from the one state to the different state.

20. The method of claim 13 wherein the providing FSMs includes providing a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions.